SPERRY
MODEL
C-11
GYROSYN®
COMPASS
SYSTEM

model C-11 GYROSY

The C-11 Gyrosyn Compass System is a *highly accurate, lightweight system* which has been designed to meet the rigid requirements of polar navigation. Since navigation in the polar areas precludes the use of a magnetically slaved gyro, system accuracy depends upon the effectiveness of the free gyro. The C-11 features a new *low-drift* gyro which achieves this high degree of accuracy through the use of new and *unique design* techniques. Remote control of apparent drift of the gyro, caused by the rotation of the earth, is provided.

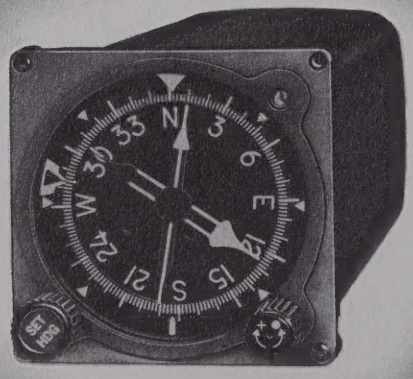
Besides providing the high-latitude functions, the C-11 also operates as a slaved gyro magnetic compass. A higher degree of accuracy and stability is achieved in the magnetic slaving mode than in any other universal system of comparable simplicity and weight. Transition from the magnetically slaved mode to the free gyro mode is made by simply flipping a switch on the Controller from "MAG" to "DG".

The C-11 system contains a Flux Valve, a Directional Gyro, a Gyrosyn Compass Master Indicator, a Controller, and a Rack assembly. The combination of these components provides a lightweight system which has a high degree of accuracy, high *serviceability*, and *universal application*, all of which are items to be considered in the selection of a compass system.

PRINCIPAL FUNCTIONS

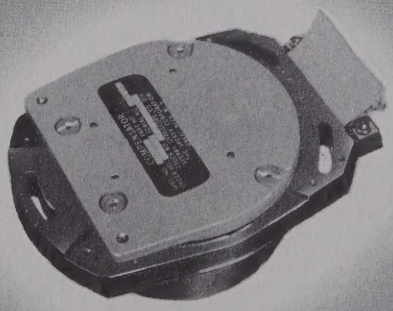
At latitudes up to 65 degrees over all the earth's surface where a magnetic compass indication is reliable, the C-11 Gyrosyn Compass System supplies accurate, deadbeat heading indications in its normal function as a slaved directional gyro.

At latitudes higher than 65 degrees, the earth's magnetic field is very unpredictable, making slaving undesirable since large errors may be introduced. For this reason, a switch on the Controller is provided so that slaving circuits may be disconnected from the system. The heading is then supplied by the free, unslaved directional gyro. Correction for apparent drift of the gyro due to the earth's rotation is made after setting the latitude corrector on the Controller to the approximate latitude. Residual error caused by random gyro wander is less than ±0.5 degree per hour from the computed apparent drift for the latitude where it is being used. The system can, therefore, be relied upon for effective navigation in the vicinity of the magnetic poles or anywhere else in polar regions, flying either great circle courses or using the grid heading system of navigation.



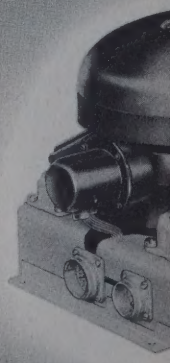
MASTER INDICATOR

Approx. weight 4-1/4 lbs.
Cut-out Dia. 3-1/8 inches
Clearance behind panel 10-1/16 in.



FLUX VALVE AND COMPENSATOR

Approx. weight 1-1/2 lbs.
Width 3-1/2 inches
Height 2-21/64 inches
Length 4-29/32 inches



DIRE

Approx.
Width 7-
Height 6
Length 8

COMPASS SYSTEM

Important Advantages OF THE C-11 GYROSYN COMPASS SYSTEM

FLUX VALVE . . . Its direction-seeking component is the accurate, dependable Sperry Flux Valve, located in a non-magnetic area of the aircraft.

DIRECTIONAL GYRO . . . The Directional Gyro is a reliable and trouble-free assembly which can be mounted wherever most convenient, with the direction indications supplied through the servo-operated, panel-mounted Gyrosyn Compass Master Indicator.

HEADING SETTING . . . Magnetic or grid heading may be set into the Master Indicator without disturbing the automatic pilot through the use of a synchronization knob located on the Master Indicator.

HEADING DATA . . . The heading data output capacity of the Master Indicator consists of two four-power transmitter synchros. In addition, it contains a transmitting synchro for providing information to a system such as the Zero Reader® Flight Director or the HZ-1 Horizon Flight Director of the Integrated Instrument System. A fourth synchro, mechanically coupled to the Directional Gyro, is available for automatic pilot operation.*

DRIFT . . . Random wander or drift of the gyro, unslaved, is less than ±0.5 degree per hour from the computed apparent drift for the latitude where it is being used.

ACCURACY . . . The C-11 is designed to give a high degree of accuracy and stability to the magnetic slaving of the gyro. The Master Compass Indicator is in effect slaved directly to the Flux Valve, eliminating any synchro error between the Directional Gyro and Master Indicator, and thereby reducing the total error of the system to a minimum. Accuracy of the gyro is enhanced by the use of materials with similar coefficients of expansion.

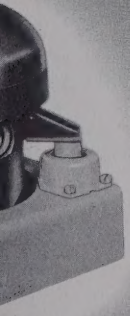
INTERCHANGEABILITY . . . Compass components and plug-in components have complete interchangeability between systems; no re-swinging or re-calibration is necessary when this is done.

LATITUDE CORRECTION . . . Remote control of apparent drift of the gyro caused by the rotation of the earth is provided. It is effective under both free and slaved operation, and is substantially independent of voltage, frequency, and temperature variation.

CONTROL CONVENIENCE . . . The Controller is designed for rack or console mounting to provide accessibility to the pilot without requiring panel space.

AUTOMATIC PILOT OPERATION . . . The Directional Gyro is mounted on vibration isolators having special frequency and damping characteristics proven in flight tests to be best for automatic pilot operation.

*For instance, the C-11 Directional Gyro may be used for supplying the directional signal for the Sperry SP-30 Flight Control System, thereby eliminating duplication of equipment.



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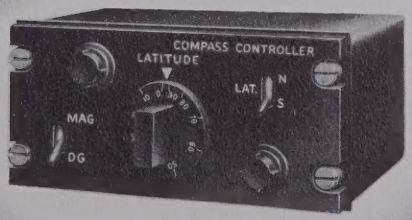
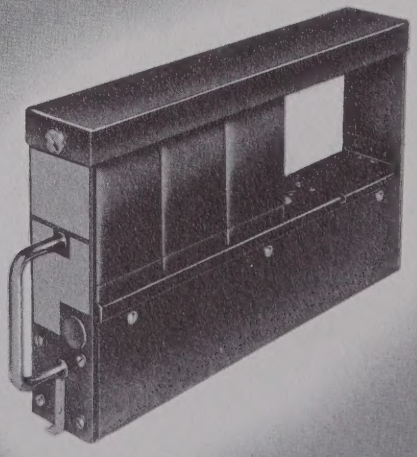


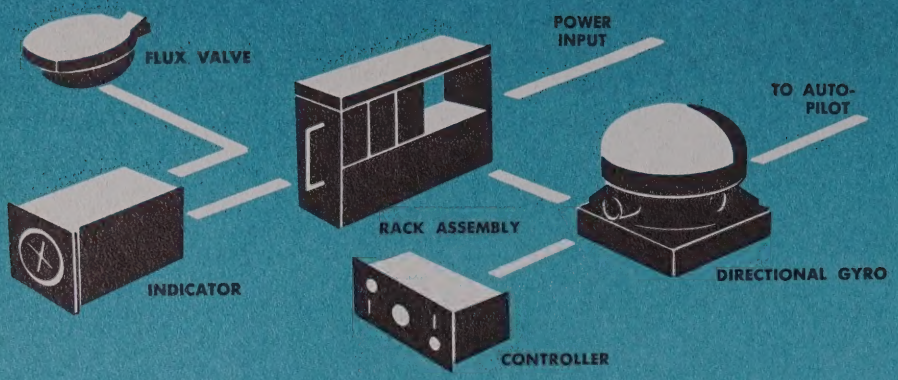
CONTROLLER

Approx. weight 1 lb.
Height 2-41/64 inches
Length 5-3/4 inches
Clearance behind
panel 3-11/16 inches



RACK ASSEMBLY

Approx. weight 5 lbs.
1/4 ATR
12-3/4 inches long



OPERATION DIAGRAM

C-11 PERFORMANCE DATA

The C-11 Compass System meets the general requirements of Military Specifications MIL-C-17858 and MIL-C-8412 for aircraft Slaved Gyro Magnetic Compasses. It is intended for use in all types of aircraft whose range of operation includes the polar regions, as well as in all other aircraft requiring precision heading reference stabilization.

DRIFT RATE: Random wander of the gyro is less than ±0.5 degree per hour from the computed apparent drift for the latitude of operation.

DYNAMIC ACCURACY: In slaved operation the signal output of the system is accurate to within 0.75 degree of the magnetic heading.

RANGE OF OPERATION: Operates at temperatures ranging from —54°C to +71°C, and at altitudes from 0 to 70,000 feet.

LATITUDE CORRECTION: Range 90° North to 90° South. Effective in both slaved or unslaved operation. Accuracy of 1/2 degree per hour.

ANNUNCIATOR SENSITIVITY: A one quarter-degree variation between the gyro indication and the Flux Valve provides a visual indication; three to five degrees of variation gives a full-scale visual indication.

INTERCHANGEABILITY: All parts are completely interchangeable. Principal components are of individually-sealed, plug-in type for ease of installation and serviceability.

MANUAL SYNCHRONIZING RATE: 50 degrees per second.

INDICATIONS: Supplied on Gyrosyn Compass Master Indicator plus any synchro-type heading repeater.

ADDITIONAL OUTPUTS: Provision for operating an automatic pilot and the Zero Reader Flight Director.

SLAVING RATE: One to two degrees per minute.

LEVELING RATE: Two to four degrees per minute.

POWER SUPPLY: 115-volt, 3-phase, 400-cycle ac. If the airplane has single-phase supply, a phase adapter can be supplied.

POWER CONSUMPTION: 75 VA ac normal, and 115 VA ac starting, from AC line.

WEIGHT: Approximate combined weight of complete system is 20 lbs.

SPERRY

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SPERRY GYROSCOPE COMPANY
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